GREAT BASIN UNIFIED AIR POLLUTION CONTROL DISTRICT

MEMORANDUM

DATE:

October 12, 2011

TO:

Chris Lanane, Guy Davis

FROM:

Mike Horn

SUBJECT:

Quality Assurance Audit Report

Attached is the draft version of the document, "Great Basin Unified Air Pollution Control District Quality Assurance Audit Report, Mono Lake Shore, October 12, 2011," for your review. Please refer any comments you may have on the document to me by December 12, 2011. If no comments are received by that date, the report will be considered final.

Thank you for your cooperation in this matter.

Great Basin Unified Air Pollution Control District Quality Assurance Audit Report

SITE: MONO LAKE SHORE

Report Date: October 12, 2011 Prepared by: Mike S. Horn

1.0 Introduction

As part of the Great Basin Unified Air Pollution Control District's (District) quality assurance (QA) program, periodic audits are conducted on the monitoring stations throughout the District. These checks, which are conducted by personnel other than those associated with the day-to-day operation and maintenance of the stations, provide additional assurance that the data collected are of high quality and meet the project objectives. The achievement of these objectives can be determined, in part, by establishing criteria within which monitoring equipment is to be operated and then testing that equipment regularly to verify its operation within those criteria.

In keeping with the District's QA program goals, the BGI, PM-10 Monitoring Station at Mono Lake Shore was audited on October 12, 2011. The audit was conducted by Mike Horn and was witnessed by Guy Davis, who is the site operator.

2.0 Parameters Audited:

T.E.O.M. PM-10

3.0 Results and Actions

The results of the audit are summarized below. Any problems found are addressed under the heading, "Action," and are given below. Sensor responses not specifically addressed below responded within the audit criteria limits. The audit data are presented in detail in Appendix A. The certifications of the audit devices are presented in Appendix B. Audit criteria based on Title 40 code of Federal Regulations Part 58, Appendix A (October 2006), the USEPA Quality Assurance Handbook for Air Pollution Measurement Systems Volumes II, 1997, and IV, 2007, and/ or on the manufactures recommendations, are presented in table A-1.

4.0 Recommendations and Comments

There are no recommendations or comments at this time.

APPENDIX A

Great Basin Unified Air Pollution Control District Tapered Element Oscillating Microbalance (TEOM) AUDIT

Date of report:	10/12/11			Site name: N	Mono Shore	
Date:	10/12/11			Operator: (Guy Davis	
Start:	11:10hrs, PST	,		Project: S	•	
Finish:	11:30hrs. PS T			Site Elevation:	6422 ft	
Audited By:	Mike Horn			Amb. Pres.:	813.50 h	Pa
Witness:	Guy Davis			Amb. Temp.:	16.6 d	eg. C
	,			Make:	R & P	
Prop. or Serial No.:	24920			Model:	1400ab	
Туре:	PM-10			Last cal. date:	6/8/11	
	AUDII	DEVICE(S)				
Make: I	BGI Incorporated	(- /		Make: I	BGI Incorporated	
	DELTA CAL				DELTA CAL	
S/N:	525			S/N:	525	
Range:	2 - 20 lpm	1			2 - 20 lp	om
•	Calibration Factors	-		•	Calibration Factors	
Slope:	1.00			Slope:	1.00	
Intercept:	0.00			Intercept:	0.00	
Cal Date:	1/4/11			Cal Date:	12/4/11	
	Main:	Aux:	Sampler temp:	Diff.		Diff.
Leak check:	0.150	0.190	16.6	0	808.37	-5.1
Dark current:	0.150	0.160				
	$Qa = [dPxTa/Pa]^{1/2} + b$		Site		Nominal F	low Rates
Audit	Audit Flow	Rate,	Flow Rate	Diff.	Lower Limit	Upper Limit
Point	ΔP, in. H2O	(VLPM)	(VLPM)	(%)	(LPM)	(LPM)
Total Flow Rate	16.96	16.96	16.68	-1.7	15.0	18.4
Bypass/Aux Flow Rate	13.87	13.87	13.69	-1.3		
Main Flow Rate	3.00	3.00	2.99	-0.3	2.7	3.3
Total Flow Rate	16.88	16.88	16.68	-1.2	15.0	18.4

Comments: None.

			asin Unified Ai Element Oscil				
				W AUDIT	TATIOE (TEUM)	0.5000000000000000000000000000000000000	en seeme e v
7074000		Т	1	TV AUDIT	7	·	Г
							
Date	16/2/2			C'A- M	m	11	
Start		DOT		Site Name		Spar	
	1111	PST		Operator		Javie	
Finish:	11:30	PST			: SB270		
		J		Site Elevation		ft	
				Amb. Press.	W. W. J. F.	in. Hg	
		1		Amb. Temp.:	16.6	deg. C	
	01100		ļ		R. C. C. Control		
Prop. Or Ser. No.:				Make:			
Type:	PM10			Model:	1400a		
			l	Last Cal. Date:	9/14/10		
					7-77		
		Audit I	Device(s)		14	l'	
Make:	BGI INCOR			Make:	BGI INCOM	PORATED	i
Model:	DELTA CAL	- UMTH		Model:	_ LCMA LIVVI	איראואיובח	
S/N:	0123 52	5		S/N:	0123	T	
Range:		Ipm		Range:		Inm	
Calibration factors:	2 - 20		Calib	ration factors:	2 - 20	Pili	
Slope:	7.0		- Januar	Quite and comment and and and			
Int.:	1.0			Slope:			
Cal Date:	-0+0-/-			Int.:	0.0		l
Cai Date:	4, 4/10			Cal Date:			
	112			l			
Q _a =m[c	IPxT _a /P _a J ^{1/2} +b		Altitude Corre	ection Factor:	- 1013		
				n			
Leak Check-Initial	Main:	.15	Aux:	17			
Leak Check-Final	Main:		Aux:			51-18	
			Site		Nominal F	low Rates	
Audit	Audit Flow	Rate	Flow Rate	Diff.	Lower Limit	Upper Limit	
Point	delta P	(VLPM)	(VLPM),	(%)	(LPM)	(LPM)	
Total Fow Rate	1/01/		100/11	79 1			
	160 760		1 7 1 1 1 4	1 / - //	/ *15.0	18 /	
Aux, Flow Rate	19377		12 /4 /3	161-16	6 815.0	18.4	
Aux. Flow Rate	13.87		13.69	161-16	.6		
Main Flow Rate	3.00		13.69	161-16	2.7	3.3	
			13.69	161-16	.6		
Main Flow Rate	3.00			1.61-16	2.7	3.3	
Main Flow Rate	16.88		Stand		2.7	3.3	
Main Flow Rate Total Flow Rate	3.00			dard Raw	2.7	3.3	
Main Flow Rate Total Flow Rate Amb Temp	16.88		Stand True		2.7	3.3	
Main Flow Rate Total Flow Rate	16.88		Stand		2.7	3.3	
Main Flow Rate Total Flow Rate Amb Temp	16.88	3	Stand True		2.7	3.3	
Main Flow Rate Total Flow Rate Amb Temp	16.88		Stand True		2.7	3.3	
Main Flow Rate Total Flow Rate Amb Temp	16.88		Stand True		2.7	3.3	
Main Flow Rate Total Flow Rate Amb Temp	16.88		Stand True		2.7	3.3	
Main Flow Rate Total Flow Rate Amb Temp	16.88		Stand True		2.7	3.3	
Main Flow Rate Total Flow Rate Amb Temp	16.88		Stand True		2.7	3.3	
Main Flow Rate Total Flow Rate Amb Temp	16.88		Stand True		2.7	3.3	
Main Flow Rate Total Flow Rate Amb Temp	16.88		Stand True		2.7	3.3	
Main Flow Rate Total Flow Rate Amb Temp	16.88		Stand True		2.7	3.3	
Main Flow Rate Total Flow Rate Amb Temp	16.88		Stand True		2.7	3.3	
Main Flow Rate Total Flow Rate Amb Temp Amb Press	16.88		Stand True		2.7	3.3	
Main Flow Rate Total Flow Rate Amb Temp	16.88		Stand True		2.7	3.3	
Main Flow Rate Total Flow Rate Amb Temp Amb Press	16.88		Stand True		2.7	3.3	
Main Flow Rate Total Flow Rate Amb Temp Amb Press	16.88		Stand True		2.7	3.3	
Main Flow Rate Total Flow Rate Amb Temp Amb Press Comments:	2.08 16.88 Sampler		Stand True		2.7	3.3	
Main Flow Rate Total Flow Rate Amb Temp Amb Press Comments:	16.88		Stand True		2.7	3.3	
Main Flow Rate Total Flow Rate Amb Temp Amb Press Comments:	2.08 16.88 Sampler		Stand True		2.7	3.3	
Main Flow Rate Total Flow Rate Amb Temp Amb Press Comments:	2.08 16.88 Sampler		Stand True		2.7	3.3	

GREAT BASIN UNIFIED AIR POLLUTION CONTROL DISTRICT

MEMORANDUM

DATE:

August 2, 2011

TO:

Chris Lanane, Guy Davis

FROM:

Mike Horn

SUBJECT:

Quality Assurance Audit Report

Attached is the draft version of the document, "Great Basin Unified Air Pollution Control District Quality Assurance Audit Report, Mono Lake Shore, August 2, 2011," for your review. Please refer any comments you may have on the document to me by October 3, 2011. If no comments are received by that date, the report will be considered final.

Thank you for your cooperation in this matter.

Great Basin Unified Air Pollution Control District Quality Assurance Audit Report

SITE: MONO LAKE SHORE

Report Date: August 2, 2011 Prepared by: Mike S. Horn

1.0 Introduction

As part of the Great Basin Unified Air Pollution Control District's (District) quality assurance (QA) program, periodic audits are conducted on the monitoring stations throughout the District. These checks, which are conducted by personnel other than those associated with the day-to-day operation and maintenance of the stations, provide additional assurance that the data collected are of high quality and meet the project objectives. The achievement of these objectives can be determined, in part, by establishing criteria within which monitoring equipment is to be operated and then testing that equipment regularly to verify its operation within those criteria.

In keeping with the District's QA program goals, the BGI, PM-10 Monitoring Station at Mono Lake Shore was audited on August 1, 2011. The audit was conducted by Mike Horn and was witnessed by Guy Davis, who is the site operator.

2.0 Parameters Audited:

T.E.O.M. PM-10

3.0 Results and Actions

The results of the audit are summarized below. Any problems found are addressed under the heading, "Action," and are given below. Sensor responses not specifically addressed below responded within the audit criteria limits. The audit data are presented in detail in Appendix A. The certifications of the audit devices are presented in Appendix B. Audit criteria based on Title 40 code of Federal Regulations Part 58, Appendix A (October 2006), the USEPA Quality Assurance Handbook for Air Pollution Measurement Systems Volumes II, 1997, and IV, 2007, and/ or on the manufactures recommendations, are presented in table A-1.

4.0 Recommendations and Comments

There are no recommendations or comments at this time.

Mono Lake Shore Audit Report August 2, 2011 Page 3

APPENDIX A

Great Basin Unified Air Pollution Control District Tapered Element Oscillating Microbalance (TEOM) AUDIT

Date of report:	8/2/11			Site name: 1	Mana Share	
Date of report. Date:	8/1/11			Operator: (
Start:	12:20hrs. PS	2T		Project: S	•	
Finish:	12:40hrs. PS			Site Elevation:	6422	A
	Mike Horn	71		Amb. Pres.:	811.00	
Audited By:				Amb. Temp.:		deg. C
Witness:	Guy Davis			Make:	R & P	deg. C
Prop. or Serial No.:	24920			Model:	1400ab	
				Last cal. date:	6/8/11	
Туре:	PM-10			Last car. uate.	0/0/11	
	AUD	IT DEVICE(S)				
Make:	BGI Incorporated			Make: I	3GI Incorporated	
Model:	DELTA CAL			Model: I	DELTA CAL	
S/N:	525			S/N:	525	
Range:	2 - 20 lp	m		Range:	2 - 20	lpm
•	Calibration Factors				Calibration Factor	'S
Slope:	1.00			Slope:	1.00	
Intercept:	0.00			Intercept:	0.00	
Cal Date:	1/4/11			Cal Date:	12/4/11	
	Main:	Aux:	Sampler temp:	Diff.	Sampler press:	Diff.
Leak check:	0.190	0.210	26.9	-0.3	808.37	-2.6
Dark current:	0.150	0.160				
	$Qa = [dPxTa/Pa]^{1/2} + b$		Site		Nominal	Flow Rates
Audit	Audit Flov	v Rate,	Flow Rate	Diff.	Lower Limit	Upper Limit
Point	ΔP, in. H2O	(VLPM)	(VLPM)	(%)	(LPM)	(LPM)
Total Flow Rate	16.96	16.96	16.68	-1.7	15.0	18.4
Bypass/Aux Flow Rate	13.94	13.94	13.69	-1.8		
Main Flow Rate	2.90	2.90	2.99	3.1	2.7	3.3

16.68

16.94

-1.5

15.0

18.4

Comments: None.

16.94

Total Flow Rate

TABLE A-1

GREAT BASIN UNIFIED AIR POLLUTION CONTROL DISTRICT QUALITY ASSURANCE PERFORMANCE AUDIT CRITERIA

Measurement Variable

Evaluation Criteria

Wind Speed

At ws ≤ 5 m/s, input ± 0.25 m/s; At ws > 5 m/s, input $\pm 5\%$

Starting threshold: 0.5 m/s;

R. M. Young 05305 Wind Monitor AQ Starting threshold: 1.0 m/s; R. M. Young 05103 Wind Monitor and NRG Max 40H

Wind Direction

input ± 5°

Starting threshold: 0.5 m/s;

R. M. Young 05305 Wind Monitor AQ Starting threshold: 1.0 m/s; R. M. Young

05103 Wind Monitor

Temperature

input \pm 0.5° C Gravimetry Lab \pm 1.0 deg. C input \pm 2.0° C for PM-10, PM-2.5 samplers

Relative Humidity

Ambient: input $\pm 5\%$ RH, ± 1.5 °C as dew point

Gravimetry Lab: input ± 5%

Precipitation

input ± 10%

Barometric Pressure

Ambient: input ± 10 hPa TEOM: ± 10 mm mercury

PM-10: Hi-Vol SSI, Partisol, BGI,

PM-2.5

input \pm 10%; Design Flow \pm 10% input \pm 4%; Design Flow \pm 5%

TEOM:

Total Flow Main Flow

Bypass Flow

input $\pm 10\%$; Design Flow $\pm 10\%$

input \pm 10%; Design Flow \pm 10% input \pm 10%; Design Flow \pm 10%

TEOM:

Leak Check

Main Flow: < 0.15 LPM Bypass Flow: < 0.60 LPM

Appendix B

GREAT BASIN UNIFIED AIR POLLUTION CONTROL DISTRICT QUALITY ASSURANCE CERTIFICATIONS OF AUDIT DEVICES

AUDIT DEVICE

	Serial #	Cal Date:	Slope:	Intercept:
BGI Delta CAL:	123	1/24/11	1.0	0.0
BGI Delta CAL:	525	1/4/11	1.0	0.0
Testo 735-1	01467895/712	12/16/10	1.0006	0.0209
Barigo Altimeter/Barometer:	Р9	12/17/10	1.0	0.0
RM Young wind speed motor:	CUO1, HSO1	12/3/10	N/A	N/A
Psychro-Dyne Psychrometer:	RH 04	N/A	1 0	1 0
Texas Electronics FC-525 Precipitation:	52202	N/A		
Chinook Eng. Streamline FTS	108	9/8/10	0.41	0.6

	7	apered	Basin Unified A Element Osci	Ilating Microb	alance (TEOM		······································	
		p 3. 5 d	FLC	W AUDIT	marice (TEOM)	!	4 4 10 4 40 4 14 14 14 14 14 14 14 14 14 14 14 14 1	9
	1	T		TODII	T	7	Т Т	
			1	-				
Date	8/1/11			Site Name	m	11		
Start		PST		Operator	11 1 10 1 101	prove		
Finish:		PST				gave		
	12.40	101		Site Elevation	t: SB270		ļL	
• =	 	+		Amb. Press.	City Control of the C	ft		
					011.	in. Hg	!	-
	ļ	+		Amb. Temp.	211	deg. C		
Prop. Or Ser. No.:	1110122		·		-			
Type:	PM10	0			: R&P			
	1 1110	-			: 1400a			
				Last Cal. Date	6/8/1/	/		
		A 174		ļ	/ / / 1			
Water			Device(s)	-				
Make:	TAKE THE COM	PORAT	ĘD	Make	THE REAL PROPERTY OF	RPORATED		
Model:	DELTA CAL	a		Model	DELTA CAL	War.		-
S/N:	0123 5	15		S/N:	0123			
Range:	2 - 20	lpm		Range:	2 - 20	1pm		==
Calibration factors:			Calib	ration factors:	- 20			
Slope:	1.0			Slope:				
Int.:	0.0 1			Int.:	- V			
Cal Date:	1/4/11			Cal Date:	0.0	 	- I-	_
	17/1					1		
Q.=mfd	PxT _a /P _a] ^{1/2} +b		Altitude Corre	ection Factor:	. 1013			
			rudiade com	Cotton ractor.	÷1013			
Leak Check-Initial	Main:	.19	Aux:					****
Leak Check-Final	Main:	16	Aux:	the same of the sa				
		117	Aux.	.76				
			Site					
Audit	Audit Flow	Bata	Flow Rate		Nominal F			
Point		(VLPM)		Diff.	Lower Limit			
Total Fow Rate	// 9/	(VEP IVI)	(VLPM)	(%)	(LPM)	(LPM)		
Aux. Flow Rate	19.16		2,79/13	67716	6 8 15.0	18.4		
	13,74		13.69					
Main Flow Rate	4:70		2,99		2.7	3.3		
Total Flow Rate	16.94		16.68	i	15.0	18.4		
	1							
			Stand	dard				
	Sampler		True	Raw	0- (0/10)			
Amb Temp	26.9			27.2				-
Amb Press	1798		808.37	8117				
								- >
								-
I I		-						
			<u> </u> .					
Comments								
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Appendix B

GREAT BASIN UNIFIED AIR POLLUTION CONTROL DISTRICT QUALITY ASSURANCE CERTIFICATIONS OF AUDIT DEVICES

ATTIOTE INTERIOR				
AUDIT DEVICE	Serial #	Cal Date:	Slope:	Intercept:
BGI Delta CAL:	123	1/24/11	1.0	0.0
BGI Delta CAL:	525	1/4/11	1.0	0.0
Testo 735-1	01467895/712	12/16/10	1.0006	0.0209
Barigo Altimeter/Barometer:	P9	12/17/10	1.0	0.0
RM Young wind speed motor:	CUO1, HSO1	12/3/10	N/A	N/A
Psychro-Dyne Psychrometer:	RH 04	N/A	1 0	
Texas Electronics FC-525 Precipitation:	52202	N/A		
Chinook Eng. Streamline FTS	108	9/8/10	0.41	0.6

TABLE A-1

GREAT BASIN UNIFIED AIR POLLUTION CONTROL DISTRICT QUALITY ASSURANCE PERFORMANCE AUDIT CRITERIA

Management	X7	
<u>Measurement Y</u>	<u>variable</u>	Evaluation Criteria
Wind Speed		At ws \leq 5 m/s, input \pm 0.25 m/s; At ws $>$ 5 m/s, input \pm 5% Starting threshold: 0.5 m/s; R. M. Young 05305 Wind Monitor AQ Starting threshold: 1.0 m/s; R. M. Young 05103 Wind Monitor and NRG Max 40H
Wind Direction	1.	input ± 5° Starting threshold: 0.5 m/s; R. M. Young 05305 Wind Monitor AQ Starting threshold: 1.0 m/s; R. M. Young 05103 Wind Monitor
Temperature		input \pm 0.5° C Gravimetry Lab \pm 1.0 deg. C input \pm 2.0° C for PM-10, PM-2.5 samplers
Relative Humic	dity	Ambient: input \pm 5% RH, \pm 1.5°C as dew point Gravimetry Lab: input \pm 5%
Precipitation		input ± 10%
Barometric Pre	essure	Ambient: input ± 10 hPa TEOM: ± 10 mm mercury
PM-10: Hi-Vol PM-2.5	SSI, Partisol, BGI,	input \pm 10%; Design Flow \pm 10% input \pm 4%; Design Flow \pm 5%
M	otal Flow Main Flow Sypass Flow	input \pm 10%; Design Flow \pm 10% input \pm 10%; Design Flow \pm 10% input \pm 10%; Design Flow \pm 10%
TEOM: L	eak Check	Main Flow: < 0.15 LPM Bypass Flow: < 0.60 LPM

GREAT BASIN UNIFIED AIR POLLUTION CONTROL DISTRICT

MEMORANDUM

DATE:

May 6, 2011

TO:

Chris Lanane, Guy Davis

FROM:

Mike Horn

SUBJECT:

Quality Assurance Audit Report

Attached is the draft version of the document, "Great Basin Unified Air Pollution Control District Quality Assurance Audit Report, Mono Lake Shore, May 6, 2011," for your review. Please refer any comments you may have on the document to me by July 6, 2011. If no comments are received by that date, the report will be considered final.

Thank you for your cooperation in this matter.

Great Basin Unified Air Pollution Control District Quality Assurance Audit Report

SITE: MONO LAKE SHORE

Report Date: May 6, 2011 Prepared by: Mike S. Horn

1.0 Introduction

As part of the Great Basin Unified Air Pollution Control District's (District) quality assurance (QA) program, periodic audits are conducted on the monitoring stations throughout the District. These checks, which are conducted by personnel other than those associated with the day-to-day operation and maintenance of the stations, provide additional assurance that the data collected are of high quality and meet the project objectives. The achievement of these objectives can be determined, in part, by establishing criteria within which monitoring equipment is to be operated and then testing that equipment regularly to verify its operation within those criteria.

In keeping with the District's QA program goals, the BGI, PM-10 Monitoring Station at Mono Lake Shore was audited on May 3, 2011. The audit was conducted by Mike Horn and was witnessed by Guy Davis, who is the site operator.

2.0 Parameters Audited:

T.E.O.M. PM-10

3.0 Results and Actions

The results of the audit are summarized below. Any problems found are addressed under the heading, "Action," and are given below. Sensor responses not specifically addressed below responded within the audit criteria limits. The audit data are presented in detail in Appendix A. The certifications of the audit devices are presented in Appendix B. Audit criteria based on Title 40 code of Federal Regulations Part 58, Appendix A (October 2006), the USEPA Quality Assurance Handbook for Air Pollution Measurement Systems Volumes II, 1997, and IV, 2007, and/ or on the manufactures recommendations, are presented in table A-1.

4.0 Recommendations and Comments

There are no recommendations or comments at this time.

Mono Lake Shore Audit Report May 6, 2011 Page 3

APPENDIX A

Great Basin Unified Air Pollution Control District Tapered Element Oscillating Microbalance (TEOM) ${\bf AUD} \Gamma {\bf \Gamma}$

D. (E/C/11			Site name: N	Iono Shore	
Date of report:	5/6/11			Operator: C		
Date:	5/3/11			Project: S	•	
Start:	12:05hrs. PST			Site Elevation:	6422	ft
Finish:	12:25hrs. PST			Amb. Pres.:	809.40	
Audited By:	Mike Horn			Amb. Temp.:		deg. C
Witness:	Guy Davis			Make:	R & P	406.0
- 0 1137	24020			Model:	1400ab	
Prop. or Serial No.:	24920			Last cal. date:	3/29/11	
Туре:	PM-10			Last car. date:	3/29/11	
	AUDIT	DEVICE(S)				
Make: I	BGI Incorporated	()		Make: E	GI Incorporated	
	DELTA CAL			Model: I	DELTA CAL	
S/N:	525			S/N:	525	
Range:	2 - 20 lpm			Range:	2 - 20	lpm
•	Calibration Factors			(Calibration Factor	rs .
Slope:	1.00			Slope:	1.00	
Intercept:	0.00			Intercept:	0.00	
Cal Date:	1/4/11			Cal Date:	12/4/11	
Car Dave.	Main:	Aux:	Sampler temp:	Diff.	Sampler press:	<u>Diff.</u>
Leak check:	0.150	0.210	20.2	0	805.36	-4.0
Dark current:	N/A	N/A				
	$Qa = [dPxTa/Pa]^{1/2} + b$	·	Site		Nomina	l Flow Rates
Audit	Audit Flow	Rate,	Flow Rate	Diff.	Lower Limit	Upper Limit
Point	ΔP, in. H2O	(VLPM)	(VLPM)	(%)	(LPM)	(LPM)
Total Flow Rate	16.99	16.99	16.67	-1.9	15.0	18.4
Bypass/Aux Flow Rate	13.91	13.91	13.68	-1.7		
Main Flow Rate	2.91	2.91	2.99	2.7	2.7	3.3
Total Flow Rate	16.98	16.98	16.67	-1.8	15.0	18.4
10001110111000						

Comments: None.

TABLE A-1

GREAT BASIN UNIFIED AIR POLLUTION CONTROL DISTRICT QUALITY ASSURANCE PERFORMANCE AUDIT CRITERIA

Evaluation Criteria

	·
Wind Speed	At ws ≤ 5 m/s, input ± 0.25 m/s; At ws > 5 m/s, input ± 5% Starting threshold: 0.5 m/s; R. M. Young 05305 Wind Monitor AQ Starting threshold: 1.0 m/s; R. M. Young 05103 Wind Monitor and NRG Max 40H
Wind Direction	input ± 5° Starting threshold: 0.5 m/s; R. M. Young 05305 Wind Monitor AQ Starting threshold: 1.0 m/s; R. M. Young 05103 Wind Monitor
Temperature	input \pm 0.5° C input \pm 2.0° C for PM-10, PM-2.5 samplers
Relative Humidity	Ambient: input \pm 5% RH, \pm 1.5°C as dew point Gravimetry Lab: input \pm 5%
Precipitation	input ± 10%
Barometric Pressure	Ambient: input ± 10 hPa TEOM: ± 10 mm mercury

TEOM: **Total Flow**

PM-10: Hi-Vol SSI, Partisol, BGI,

PM-2.5

Measurement Variable

input \pm 10%; Design Flow \pm 10% input \pm 10%; Design Flow \pm 10% Main Flow input \pm 10%; Design Flow \pm 10% Bypass Flow

TEOM: Leak Check Main Flow: < 0.15 LPM

Bypass Flow: < 0.60 LPM

input ± 10%; Design Flow ± 10%

input $\pm 4\%$; Design Flow $\pm 5\%$

Appendix B

GREAT BASIN UNIFIED AIR POLLUTION CONTROL DISTRICT QUALITY ASSURANCE CERTIFICATIONS OF AUDIT DEVICES

AUDIT DEVICE	Serial #	Cal Date:	Slope:	Intercept:
BGI Delta CAL:	123	1/24/11	1.0	0.0
BGI Delta CAL:	525	1/4/11	1.0	0.0
Testo 735-1	01467895/712	12/16/10	1.0006	0.0209
Barigo Altimeter/Barometer:	P9	12/17/10	1.0	0.0
RM Young wind speed motor:	CUO1, HSO1	12/3/10	N/A	N/A
Cole-Parmer 3312-40 Psychrometer:	RH 03	12/10/04	Wet 1.0037 Dry 1.0059	Wet -0.0598 Dry -0.1518
Texas Electronics FC-525 Precipitation:	52202	N/A		
Chinook Eng. Streamline FTS	108	9/8/10	0.41	0.6

		apered	Element Osc	illating Microb	alance (TEOM)	
	1		FLO	OW AUDIT		i dimining an Seco	40 E 404000 E E
-1							
	21-1				10	00	
Date		/		Site Name	1 1 00 100	- dans	
Start		PST		Operato	r. Ken/2	laver	
Finish	: 12:25	PST		Projec	t: SB270/		
* ten (************************************	10 120			Site Elevation		ft	+
			T	Amb. Press	: 809.4	in. Hg	
				Amb. Temp	: 707	deg. C	
					4.0.5	1.03.0	
Prop. Or Ser. No.:	24920)		Make	: R&P		
Type:	PM10				I: 1400a		
		16		Last Cal. Date		1	
				1	0/27	111	
Target No.		Audit	Device(s)		1	-	ļ
Make:	BGT INCOM	DODET	do	Make	DOT THE	<u> </u>	
Model:	DELTA CAL	CPUKAL	μ			RPORATED	
S/N:		4		Model	DELTA CA	L	
	U173 29	i tariini		S/N	-UICO		
Range: Calibration factors:	2 - 20	lpm		Range	2 - 20	Ipm	
		ļ	Calib	oration factors	:		
Slope:	1.0			Slope			
Int.:	0.0.1			Int.:	0.0-		
Cal Date:	1/4/1/		7. 3	Cal Date:		1	
						1	
Q _e =m[c	IPxT _e /P _e J ^{1/2} +b		Altitude Corr	rection Factor:	÷1013		
				T	- 1013		ļ
Leak Check-Initial	Main:	115	Aux	111	ļ		
Leak Check-Final	Main:	4.0	Aux	the same of the sa			
					7		
			Site				
Audit	Audit Flow	Data	Flow Rate		Nominal F	low Rates	
Point		(VLPM)		Diff.	Lower Limit		
Total Fow Rate	1/ 90	(VLF WI)	(VLPM)	(%)	(LPM)	(LPM)	
Aux. Flow Rate	16.17		13.77/1	3.6851	6.675.0	18.4	
	13.91		13.681				
Main Flow Rate	2.91		2.77		2.7	3.3	
Total Flow Rate	16.98		16.67		15.0	18.4	
			Stan	dard	1000	-	
***************************************	Sampler		True	Raw		-	
Amb Temp	20.2			20 7			
Amb Press	.795		805.36	809 11			
			000.00	- 40 1.7			
		1					
Comments:							
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Comments:							
Comments:	m. A.						

GREAT BASIN UNIFIED AIR POLLUTION CONTROL DISTRICT

MEMORANDUM

DATE:

February 4, 2011

TO:

Chris Lanane, Guy Davis

FROM:

Mike Horn//

SUBJECT:

Quality Assurance Audit Report

Attached is the draft version of the document, "Great Basin Unified Air Pollution Control District Quality Assurance Audit Report, Mono Lake Shore, February 4, 2011," for your review. Please refer any comments you may have on the document to me by April 4, 2011. If no comments are received by that date, the report will be considered final.

Thank you for your cooperation in this matter.

Great Basin Unified Air Pollution Control District Quality Assurance Audit Report

SITE: MONO LAKE SHORE

Report Date: February 4, 2011 Prepared by: Mike S. Horn

1.0 Introduction

As part of the Great Basin Unified Air Pollution Control District's (District) quality assurance (QA) program, periodic audits are conducted on the monitoring stations throughout the District. These checks, which are conducted by personnel other than those associated with the day-to-day operation and maintenance of the stations, provide additional assurance that the data collected are of high quality and meet the project objectives. The achievement of these objectives can be determined, in part, by establishing criteria within which monitoring equipment is to be operated and then testing that equipment regularly to verify its operation within those criteria.

In keeping with the District's QA program goals, the BGI, PM-10 Monitoring Station at Mono Lake Shore was audited on February 2, 2011. The audit was conducted by Mike Horn and was witnessed by Guy Davis, who is the site operator.

2.0 Parameters Audited:

T.E.O.M. PM-10

3.0 Results and Actions

The results of the audit are summarized below. Any problems found are addressed under the heading, "Action," and are given below. Sensor responses not specifically addressed below responded within the audit criteria limits. The audit data are presented in detail in Appendix A. The certifications of the audit devices are presented in Appendix B. Audit criteria based on Title 40 code of Federal Regulations Part 58, Appendix A (October 2006), the USEPA Quality Assurance Handbook for Air Pollution Measurement Systems Volumes II, 1997, and IV, 2007, and/ or on the manufactures recommendations, are presented in table A-1.

4.0 Recommendations and Comments

There are no recommendations or comments at this time.

Mono Lake Shore Audit Report February 4, 2011 Page 3

APPENDIX A

Great Basin Unified Air Pollution Control District Tapered Element Oscillating Microbalance (TEOM) AUDIT

Date of report:	2/4/11			Site name:			
Date:	2/2/11			Operator:	Guy Davis		
Start:	12:30hrs. PS 7			Project:	SB - 270		
Finish:	12:50hrs. PS T	-		Site Elevation:	6422	ft.	
Audited By:	Mike Horn			Amb. Pres.:	813.50	hPa	
Witness:	Guy Davis			Amb. Temp.:	-1.0	deg. C	
				Make:	R & P		
Prop. or Serial No.:	24920			Model:	1400ab		
Type:	PM-10			Last cal. date:	1/7/11		
		DEVICE(S)					
Make:		Make: l	BGI Incorporated				
Make: BGI Incorporated Model: DELTA CAL					Model: DELTA CAL		
S/N:	525			S/N:	525		
Range:	2 - 20 lpm	1		Range:	2 - 20	lom	
Calibration Factors				Calibration Factors			
Slope:	1.00			Slope:	1.00		
Intercept:	0.00			Intercept:	0.00		
Cal Date:	1/4/11			Cal Date:	12/4/11		
	Main:	Aux:	Sampler temp:	Diff.	Sampler press:	Diff.	
Leak check:	0.160	0.220	-1.8	-0.8	810.40	-3.1	
Dark current:	N/A	N/A			313112	J.1	
	$Qa = [dPxTa/Pa]^{1/2} + b$	•	Site		Nominal	Flow Rates	
Audit	Audit Flow	Audit Flow Rate,		Diff.	Lower Limit	Upper Limit	
Point	ΔP, in. H2O	(VLPM)	(VLPM)	(%)	(LPM)	(LPM)	
Total Flow Rate	17.04	17.04	16.67	-2.2	15.0	18.4	
Bypass/Aux Flow Rate	13.94	13.94	13.68	-1.9			
Main Flow Rate	2.99	2.99	2.99	0.0	2.7	3.3	
Total Flow Rate	16.94	16.94	16.67	-1.6	15.0	18.4	

Comments: None.

TABLE A-1

GREAT BASIN UNIFIED AIR POLLUTION CONTROL DISTRICT QUALITY ASSURANCE PERFORMANCE AUDIT CRITERIA

Measureme	nt Variable	Evaluation Criteria
Wind Speed		At ws ≤ 5 m/s, input ± 0.25 m/s; At ws > 5 m/s, input ± 5% Starting threshold: 0.5 m/s; R. M. Young 05305 Wind Monitor AQ Starting threshold: 1.0 m/s; R. M. Young 05103 Wind Monitor and NRG Max 40H
Wind Direct	ion	input ± 5° Starting threshold: 0.5 m/s; R. M. Young 05305 Wind Monitor AQ Starting threshold: 1.0 m/s; R. M. Young 05103 Wind Monitor
Temperatur	re	input \pm 0.5° C input \pm 2.0° C for PM-10, PM-2.5 samplers
Relative Hu	midity	Ambient: input \pm 5% RH, \pm 1.5°C as dew point Gravimetry Lab: input \pm 5%
Precipitation	n	input ± 10%
Barometric	Pressure	Ambient: input \pm 10 hPa TEOM: \pm 10 mm mercury
PM-10: Hi-Vol SSI, Partisol, BGI, PM-2.5		input \pm 10%; Design Flow \pm 10% input \pm 4%; Design Flow \pm 5%
TEOM:	Total Flow Main Flow Bypass Flow	input \pm 10%; Design Flow \pm 10% input \pm 10%; Design Flow \pm 10% input \pm 10%; Design Flow \pm 10%
TEOM:	Leak Check	Main Flow: < 0.15 LPM Bypass Flow: < 0.60 LPM

Appendix B

GREAT BASIN UNIFIED AIR POLLUTION CONTROL DISTRICT QUALITY ASSURANCE CERTIFICATIONS OF AUDIT DEVICES

AUDIT DEVICE

	Serial #	Cal Date:	Slope:	Intercept:
BGI Delta CAL:	123	1/24/11	1.0	0.0
BGI Delta CAL:	525	1/4/11	1.0	0.0
Testo 735-1	01467895/712	12/16/10	1.0006	0.0209
Barigo Altimeter/Barometer:	P9	12/17/10	1.0	0.0
RM Young wind speed motor:	CUO1, HSO1	12/3/10	N/A	N/A
Cole-Parmer 3312-40 Psychrometer:	RH 03	12/10/04	Wet 1.0037 Dry 1.0059	Wet -0.0598 Dry -0.1518
Texas Electronics FC-525 Precipitation:	52202	N/A		

·	1	apered	Element Oscil	lating Microba	lance (TEOM)		
				W AUDIT		**************************************	ens and total for
					11-0		T T
	1					00	
Date				Site Name	: mono	1 Keep	
Start	12:30	PST		Operator		aver	
Finish:	12:50	PST			: SB270	area_	
	17.00			Site Elevation		ft	+
				Amb. Press.		in. Hg	
				Amb. Temp.	017.7	deg. C	
		 		Time remp.	-1.0	deg. c	
Prop. Or Ser. No.:	24920		1	Make:	DRD	-	
	PM10				1400a		
				Last Cal. Date:		 	
		-	<u> </u>	Lust Gai. Date.	1/1/1	/ 	
		Audit	Device(s)				
Make	DCT THOSE			Banton	'nor -		
Model:	BGI INCOR	EUKAT	4 0	Make:	- CMA ALLUM	RPORATED	
S/N:	DELTA CAL	-		Model:	DELTA CAI	T	
	0123 52			S/N:	0123		
Range: Calibration factors:	2 - 20	lpm		Range:	2 - 20	lpm	
			Calibi	ration factors:			
Slope:	1.0	1		Slope:	1.0		
Int.:	0,0_/_	1		Int.:	0.0	Y	
Cal Date:	1,4/11			Cal Date:			
	/ /				****		
Q _a =m[d	PxT_/P_] ^{1/2} +b		Altitude Corre	ection Factor:	÷ 1013		
Leak Check-Initial	Main:	.16	Aux:	,12			
Leak Check-Final	Main:		Aux:				
			Site		Nominal Fi	ow Rates	
Audit	Audit Flow	Rate	Flow Rate	Diff.	Lower Limit	Unner Limit	
Point	delta P	(VLPM)	(VLPM)	(%)	(LPM)	(LPM)	
Total Fow Rate	1714		2.79/13/	111 111	7 15.0		
Aux. Flow Rate	13.99		12/1/20	8 = 16.6	10.0	18.4	
Main Flow Rate	2 99		2.99		2.7		
Total Flow Rate	1694				15.0	3.3	
	16-14		16.67		15.0	18.4	
			Stand	d			
	Sampler						
Amb Temp			True	Raw			
Amb Press	.800		0.15	2100			
Allib Press	-1.8		810.40	8/3.5			
					ment on the continuent time or many		
Comments:							
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